CLEAN AIR TASK FORCE

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June 12, 2003

Mr. Jeffery Kitsembel
Public Service Commission of Wisconsin
P.O. Box 7854
Madison, WI 53707-7854

Re: PSC docket number 05-CE-130, Comments on the Draft EIS

Dear Mr. Kitsembel:

The Clean Air Task Force is a national environmental organization that is headquartered in Boston and operates across the nation. Our mission is to maintain and restore healthy air. We accomplish this mission through research, advocacy and education. We have been a member of RESET since shortly after its founding.

We welcome the opportunity to comment on the Draft EIS (DEIS) for the of the Elm Road expansion. Because many of our concerns have been raised by other RESET member organizations in their DEIS comments, we will focus on only two issues. These issues are the failure of the DEIS to monetize the health damage associated with $PM_{2.5}$ and the failure of the DEIS to capture the full value of natural gas plants.

Monetizing $PM_{2.5}$ Health Damage

The DEIS makes only passing reference to the health damage associated with fine particles. These particles can be directly emitted by power plants, or they can form downwind of the stack as sulfur dioxide and nitrogen oxide are converted to sulfates and nitrates. The DEIS correctly links fine particles with health impacts such as premature deaths, asthma attacks, and other lung ailments. Scientists generally agree that the response to these pollutants is linear. Therefore, adverse impacts continue at ambient air concentrations that are below national air quality standards. The failure to quantify and monetize these impacts is a major shortcoming in DEIS.

There are several approaches that could be used to quantify the number of deaths and other health impacts associated with coal plant emissions. The approach most applicable to the Oak Creek expansion has been published in peer-reviewed articles by Harvard researchers Jon Levy and Jack Spengler.[1] In this approach, the PM

[1] See Levy, J. I., Spengler, J. D., et al. *Using CALPUFF to Evaluate the Impacts of Power Plant Emissions in Illinois: Model Sensitivity and Implications*. 36 Atmospheric

emissions of specific plants are modeled and a damage function is applied to estimate health endpoints such as premature deaths and asthma attacks. These impacts are monetized using standard EPA protocols. Abt Associates[2] and USEPA[3] used similar approaches to estimate impacts from larger groups of power plants.

Absent detailed modeling, the DEIS could apply a monetization approach used by the United Nations Development Programme[4]. In this approach, PM damage in the United States is estimated using data from the European Commission's ExternE Programme. The UN report identifies $5.3/MWH of PM damage associated with a conventional coal plants meeting BACT. For an IGCC plant, the damage is about $.53/MWH, and an NGCC plant has PM damage of $.37/MWH. Table 8.1 from the UN study that details these findings is attached to these comments.

The values from the UN study may need some adaptation for use in Wisconsin. First, these damage estimates are based upon the low economic valuations for European conditions. This choice places less value on human life and disease than is found in USEPA's valuation methodology. This very conservative choice may understate PM damage in $/MWH by a factor of three or more. Furthermore, BACT for conventional coal plants in the UN report assumed no SCR and a lower sulfur coal than is proposed at Elm Road. This has the effect of overstating the impact of nitrogen oxides and understating the impact of sulfur dioxide relative to Elm Road's SCPC units.

<u>The true economic value of natural gas plants is underestimated in the economic analysis found in the DEIS.</u>

Combined cycle natural gas plants, if properly designed and sited for the purpose, can later be converted to IGCC plants. This conversion might be desirable should the gap between natural gas prices and other fuels as coal or petroleum coke make this switch advantageous. This option has an economic value that is not captured by the DEIS. As a result, the DEIS undervalues natural gas plants. This may skew the EGEAS models away from building combined cycle natural gas plants and toward building SCPC units.

Environment 1063-1075 (2002). and Levy, J. I., Spengler, J.D., *Modeling the Benefits of Power Plant Emission Controls in Massachusetts,* v. 52, 5-18, J. Air & Waste Manage. Assoc., (2002).

[2] "Death, Disease and Dirty Power", available at http://www.catf.us/publications/index.php

[3] Clear Skies Act, Technical Support Package, September 2002, available at http://www.epa.gov/clearskies/technical.html

[4] "World Energy Assessment", United Nations Development Programme, Chapter 8, (September 2000) . This report is available on the web at http://www.undp.org/seed/eap/activities/wea/drafts-frame.html

This option value is no small matter. The problem with Power the Future is that it locks consumers into paying for capital-intensive coal plants. This is an irreversible decision. If WE Energies predictions about future regulations, gas prices, and construction costs are wrong, the cost of electricity under PTF will be much greater than the company predicts. Because a natural gas plant has the option value of using other fuels when converted to IGCC, consumer's financial risk due to changing conditions is reduced.

The DEIS needs to consider two changes: 1) Adding an option value to the natural gas plants that reflects their higher economic value, and/or 2) Modifying the inputs to the EGEAS modeling so that the model can build combined cycle gas plants and later convert them to IGCC plants.

A scenario with an "NGCC to IGCC" plant would likely have a higher NPV than a pure NGCC scenario or a pure IGCC scenario because the combination plant could generate revenue sooner than a pure IGCC plant and generate more revenue in later years than a pure NGCC plant. Furthermore, because the cost of conversion takes place in later years, the discounted costs for an "NGCC to IGCC" plant might be lower than a pure IGCC plant.

The key technical barriers to the conversion include:

- Using a site that has both rail access for coal and natural gas access.

- Designing from the beginning the natural gas plant so that the power block could later accommodate syngas. The cost of converting the turbine from natural gas to syngas is roughly $25/KW of installed capacity in today's dollars. The cost of expanding the HRSG is minor if enough space is reserved at the beginning to add additional cooling tubes.

The EGEAS modeling in the DEIS assumes availability of the IGCC plant of only 75%-85%. This availability assumption is too low for both the pure IGCC plant considered in DEIS and an "NGCC to IGCC" plant. The 75%-85% availability applies to today's IGCC plants that run on a single gasification train with no spare gasifier. This situation describes the Polk, Florida IGCC plant and the Wabash Plant in West Terre Haute, Indiana. WE Energies proposes a spare gasifier in their WDNR air permit. Gasification plants that have a spare gasifier (such as Eastman Chemicals acetic anhydride plant in Kingsport Tennessee) have availabilities of over 98%. The impact of the low availability assumption is to underestimate the NPV of both the pure IGCC plant and the "NGCC to IGCC" option. The DEIS did not consider the use of petroleum coke in the IGCC plant. Unlike SCPC units, IGCC plants can use this low cost fuel. The sensitivity analysis of the EGEAS modeling should examine the economic impact of this fuel.

Thank you in advance for your consideration. If you have questions or need clarifications, please contact me at (618) 457-0137 or jthompson@catf.us

Sincerely,

John Thompson
Advocacy Coordinator

TABLE 8.1. EMISSION RATES FOR AND ESTIMATED COSTS OF ENVIRONMENTAL DAMAGE FROM AIR POLLUTANT EMISSIONS OF FOSSIL FUEL POWER PLANT (LOW VALUATION FOR TYPICAL EUROPEAN CONDITIONS)

	Emission rate (grams per kilowatt-hour)			Low estimate of costs of environmental damages (dollars per thousand kilowatt-hours) a				Environmental damage costs relative to NGCC
Primary air pollutant	SO2	NOx	PM10	SO2	NOx	PM10	Total	Total
Average U.S. coal steam-electric plant, 1997	6.10b	3.47 b	0.16 c	15.9	13.9	0.7	30.5	82
New coal steam-electric plant with best available control technology d	0.46	0.87	0.15 c	1.2	3.5	0.6	5.3	14
Coal IGCC plant e	0.075	0.082	0.0025	0.2	0.33	0.01	0.54	1.5
NGCC plant f	—	0.092	—	—	0.37	—	0.37	1

a. Environmental damage costs from power plant air pollutant emissions are assumed to be 25 percent of the median estimates of Rabl and Spadaro (2000) for typical power plant sitings in Europe. (The Rabl and Spadaro calculations were carried out under the European Commission's ExternE Programme. Nearly all the estimated costs of environmental damages are associated with adverse health impacts; the economic values of health impacts were estimated on the basis of the principle of willingness to pay to avoid adverse health effects.) Rabl and Spadaro considered a wide range of pollutants, but the only significant damage costs were from SO2, NOx, and PM10, for which their median estimates of damage costs (in dollars per kilogram) were $10.44, $16.00, and $17.00. Damage costs at 25 percent of the median estimates of Rabl and Spadaro (equivalent to one standard deviation below the median) are assumed, to put a conservatism into the calculation to reflect the scientific uncertainty. b. Average emission rates in 1997 for U.S. coal plants, whose average efficiency was 33 percent (EIA, 1998b). c. In 1990 PM10 emissions from U.S. electric utility coal power plants amounted to 245,000 tonnes (Spengler and Wilson, 1996) when these plants consumed 17.1 exajoules of coal (EIA, 1998b), so the PM10 emission rate was 14.34 grams per gigajoule—the assumed emission rate for all steam-electric cases in this table. d. It is assumed that the new coal steam-electric plant is 35.5 percent efficient; that the coal contains 454 grams of sulphur per gigajoule (1.08 percent sulphur by weight), the average for U.S. coal power plants in 1997 (EIA, 1998b); that SO2 emissions are reduced 95 percent, a commercially feasible rate; and that the NOx emission rate is 86 grams per gigajoule—achievable with advanced low-NOx burners that will be commercially available shortly; e. It is assumed that the coal integrated gasifier combined cycle (IGCC) plant is 43.8 percent efficient, based on use of steam-cooled gas turbines (see table 8.4); that the emission rates equal the measured values for the Buggenum coal IGCC plant (Netherlands): 10.0 and 0.3 grams per gigajoule of coal for NOx and particulates, respectively, as well as 99 percent sulphur recovery (data presented by Co van Liere, KEMA, at the Gasification Technologies Conference in San Francisco, 17–20 October 1999); and that the coal contains 454 grams of sulphur per gigajoule. f. It is assumed that the natural gas combined cycle (NGCC) plant is 54.1 percent efficient, based on use of steam-cooled gas turbines (see table 8.4); and that the NOx emission rate is 9 parts per million on a dry volume basis (at 15 percent O2), corresponding to an emission rate of 0.092 grams per kilowatt-hour.